

NASA TECH BRIEF

Goddard Space Flight Center



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Significance Arithmetic Experimental Package (SIGPAC)

The problem:

To provide a fully mechanistic "numerical procedure debugging" tool for users of conventional procedural programming languages (initially, Standard FORTRAN). This method would test actual error propagation in numerical calculations.

The solution:

A software package was developed to solve the problem stated above.

How it's done:

SIGPAC consists, in effect, of a compiler from FORTRAN source language into an artificial object language in which arithmetic operations produce, in addition to numerical results, a measure of the current significance of each result operand.

The purpose of SIGPAC is to provide to the scientific and engineering users of the IBM-360/95 computing facility a convenient, effective, and quite general means for testing and indicating the accuracy of computer calculations.

This work has two primary goals.

- (a) To permit the testing and localizing of weaknesses within numerical procedures for abnormal error

propagation from generated (primary truncation) errors.

- (b) To provide an objective basis for determining when single precision gives adequate significance or when double precision should be used.

Notes:

1. This program is programmed in both FORTRAN IV (72%) and ASSEMBLER (28%) languages to be utilized by the IBM-360/95 computer.
2. Inquiries concerning this program should be directed to:

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